SPG RTO Operating Protocol Summary

System Operations

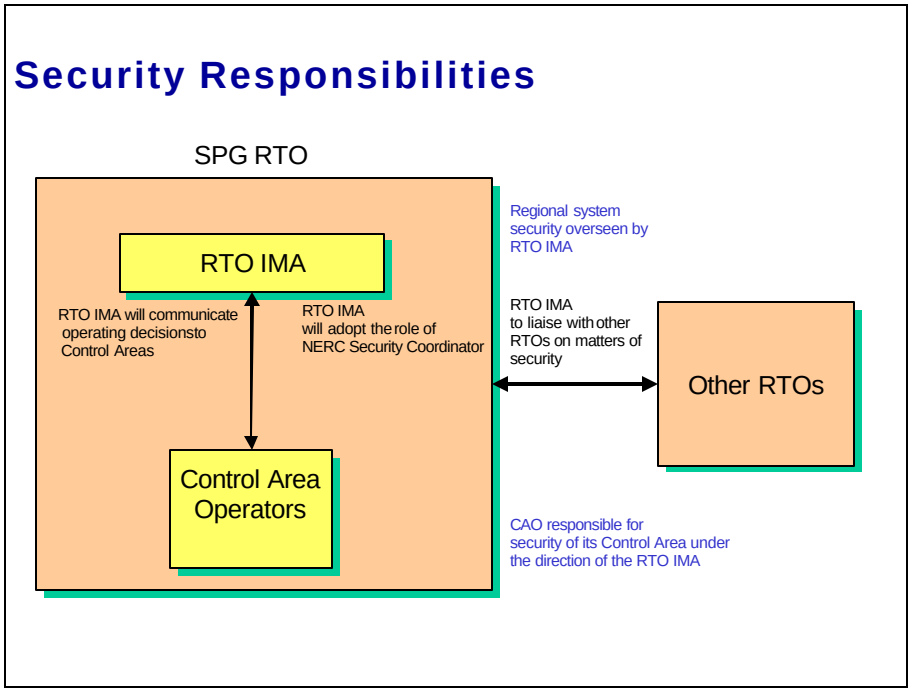
1.1. System Operations Overview

System Operations Protocols

- This section sets out an overview of the protocols for the Systems Operations area and the roles and responsibilities of the Transco, the Independent Market Administrator (RTO IMA) and the individual Control Area Operators (CAO) within the Southeast Power Grid (SPG) RTO.
- As described in the Overview section of this strawman, it is contemplated that the RTO Board would initially contractually delegate certain responsibilities to the IMA, as described herein, but some of these functions may revert back to the Transco at a later date.

Overall Responsibilities for System Operations

The following table sets out the split of responsibilities for System Operations activities between the RTO IMA and CAO.



Systems Operations Summary

The following table sets out the responsibilities between the RTO Independent Market Administrator and the individual Control Area Operators in the SPG RTO:

RTO Independent Market Administrator	*[1]Control Area Operators*
NERC Security Coordinator	NERC Control Area
Issue security instructions	Implement security instructions from RTO
Approve CAO Operating Procedures	Operate CAO bulk transmission system under the direction of the RTO IMA and in accordance with CAO Operating Procedures.
Approve transmission system outages and coordinate generation outages	Review transmission outage plans submitted by facility owners for CAO area and report conflicts/recommendations to RTO IMA.
Call TLRs	Implement TLR cut list per RTO instructions.
[2]Day-ahead scheduling and capacity assessment	Supply security constraints to RTO IMA
Approve system restoration plan	Develop and submit system restoration plan to the RTO for the CAO area. Implement approved plan.
Provider of last resort (POLR) for all Ancillary Services.	Provider of ancillary services. Activate ancillary services in accordance with agreed RTO operating procedures.
Administer spot energy market for balancing energy (Schedule 4) and congestion management.	None
Monitor Ancillary Services/Set AS requirements including locational needs.	Provide Ancillary Services monitoring data
Reserve monitoring	AGC, AVR, frequency control monitoring
Provides scheduling system for RTO wide use. Implements schedules and calculates net interchange, including schedule adjustments for the RT Market.	Uses RTO Scheduling System for Control Area approval and check out of all schedules, including interchange. Uses approved schedules and net interchange in EMS.

[1] Transco and ITCs may also be Control Areas

[2] Plan for addressing reliability related generation issues will need to be developed. This may include contracts between generation suppliers and the RTO.

1.2. Operating Procedures

Operating Procedures Overview

Control Area Operators operate their Bulk Power Transmission Facilities in agreement with the NERC Operating Guidelines and under the direction of the NERC Security Coordinator (RTO IMA). The RTO will develop, in collaboration with the CAO, CAO Operating Procedures that define the CAO's responsibilities and authorities during real time operations to ensure they are consistent with RTO's real time balancing market rules.

By following these procedures, CAO (under the direction of the RTO) will ensure that its Control Area is operated such that the following limits are not violated:

- Transmission facility thermal operations.
- Reactive transfer limits.
- Stability limits.

To ensure that these limits are not violated, both the RTO and the CAO monitor the following parameters:

- Real power flows.
- Reactive power flows.
- Voltages.
- Frequency.
- Net tie flows.

The operating procedures have three major purposes:

1. Operators can follow defined procedures in the event of a contingency or security violation.

2. Operating procedures can be published and made available as public documents so market participants can be aware of constraints in how the system must be operated for security purposes.

3. The system must be run to withstand the probable contingency events in order to maintain system security. Contingencies are required as an input into the RTO IMA market systems so that CAO security requirements are taken into account each time the market solves.

The CAO, under the direction of the NERC Security Coordinator (RTO IMA) uses the appropriate procedures to:

- Maintain acceptable voltage levels.
- Maintain operation within stability limits.
- Minimize the risk of cascading interruptions to the transmission system.
- Prevent physical damage to Bulk Power Transmission Facilities.
- Eliminate overloads that cannot be removed by other means.

The consequences of violating these limits may lead to CAO Control Area instability, load shedding, or equipment damage. The goal of the RTO and CAO is to operate the Bulk Power Transmission Facilities such that system reliability is maintained. According to NERC Operating Policy, once a contingency event occurs, the control area has 30 minutes to return the system to a state that it can withstand the next worse contingency event. Analysis for the next worst contingency must then be performed. The CAO, under the direction of the RTO IMA, will perform the following post-contingency actions to maintain system security:

- Recloses tripped facilities (temporary faults).
- Removes equipment from service (permanent faults).
- Shifts generation/activates reserves at the direction of the RTO. (The RTO will issue these instructions to the CAO based on the result of its real time dispatch process.)
- Raises generator VAR output for voltage support.
- Adjusts capacitors and reactors.
- Cancels maintenance outages.
- Uses alternative flow paths by opening transmission facilities.
- Drops or reduces load.
- Analyzes true environmental conditions in area of overloaded facilities to access risk.

RTO IMA Responsibilities regarding Systems Operations Operating Procedures

RTO IMA is responsible for the security of the system as a whole. Additionally, the RTO IMA will coordinate the dispatch of the Real Time Spot energy market to manage congestion and provide balancing energy service. RTO IMA must ensure that all

Control Areas within the SPG RTO have operating procedures in place and that they meet the security requirements of the SPG RTO.

Specifically RTO IMA has the following responsibility:

- Review and approve the CAO Operating Procedures as they relate to market operations to ensure non-discriminatory system access.
- Apply RTO security constraints and limits to the real time market systems as constraints.
- Publish CAO's operating limit constraints as part of market data.
- Provide central dispatch for the spot energy market to manage congestion and provide balancing energy service.

CAO Responsibilities regarding Operating Procedures

The CAO is responsible for directing the operation of the Bulk Power Transmission Facilities in the CAO Control Area as directed by the RTO. Specifically, CAO performs the following functions:

- Implements the dispatch instructions from the RTO and coordinates the operations of the Bulk Power Transmission Facilities.
- Develops operating guidelines for the operation of transmission facilities in the CAO Control Area for the RTO's review and approval.
- Coordinates planned and maintenance outages of transmission facilities, including coordination of outages of transmission facilities with generation outages. Where there are conflicting outages the RTO IMA will perform a coordination role to resolve these conflicts. The RTO IMA has approval authority for planned and maintenance outages of the bulk power transmission facilities.

1.3. Ancillary Services

Ancillary Services Overview

Ancillary Services can only be understood as part of a larger picture. The bulk power system is often perceived as integrating generation, load and transmission. However, the set of services that both maintain the optimal conditions on the transmission system and that guard against inevitable contingencies that occur are also a vital part of that system.

Ancillary Services are needed to maintain voltage levels within acceptable limits, to ensure that interconnection frequency is maintained, to balance the scheduled delivery and actual delivery of energy to load and to ensure that sufficient reserves are available in case of a failure in part of the system.

For the SPG RTO, the RTO IMA:

- Performs the Transco's provider of last resort function for all ancillary services.
- Can purchase these services from any approved ancillary service provider.
- Sets the Ancillary Service performance and locational standards.

The Transco (RTO) Open Access Tariff requires that the following ancillary services be offered by the Transmission Provider. The RTO IMA will perform this function on behalf of the Transco:

1. Scheduling and Tariff Administration Service
2. Reactive Supply and Voltage Control
3. Regulation and Frequency Response Service
4. Energy Imbalance Service
5. Operating Reserve – Spinning
6. Operating Reserve – Supplemental

Schedule 1 Scheduling, system control and dispatch service

This service is required to schedule the movement of power through, out of, within, or into Control Areas. This service will be provided by the RTO IMA and the CAOs on behalf of the Transmission Provider for transactions scheduled on the respective systems and will be billed by the Transco. This service cannot be self-provided.

Schedule 2 Reactive Supply and Voltage Support from Generation Sources Service

In order to maintain transmission voltages on the Transmission Provider's Transmission facilities within acceptable limits, generation facilities under the control area operator are operated to produce (or absorb) reactive power.

This service must be provided for each transaction on the Transmission Provider's transmission facilities

The amount of ***Reactive Supply and Voltage Control from Generation Sources Service*** that must be supplied with respect to the Transmission Customer's transaction will be determined based on the reactive power support necessary to maintain transmission voltages within limits that are generally accepted in the region and consistently adhered to by the Transmission Provider.

Schedule 3 Regulation and Frequency Response Service

Regulation and Frequency Response Service is necessary to provide for the continuous balancing of resources (generation and interchange) with load and for maintaining scheduled interconnection frequency at sixty cycles per second (60Hz). This service is accomplished by committing on line generation whose output is raised on lowered (predominantly through the use of automatic generating control equipment) as necessary to follow the moment-by-moment changes in load. The obligation to maintain this balance between resources and load lies with the Transmission Provider (or the Control Area operator that performs this function for the Transmission Provider).

The Transmission Customer must either purchase this service from the Transmission Provider or make alternative comparable arrangements to satisfy its ***Regulation and Frequency Response Service*** obligation within the control area its load is located.

Schedule 4 Energy Imbalance Service

Energy Imbalance Service is provided when a difference occurs between generation and load within the SPG RTO market.

The Transmission Customer must either purchase this service from the Transmission Provider or make alternative comparable arrangements to satisfy its ***Energy Imbalance Service*** obligation.

This service will be delivered in the SPG RTO through the real time balancing market once the market based congestion management system is in place. For the CAO Control Area all energy imbalances provided by the RTO IMA real time balancing market will be settled by the RTO IMA.

Schedule 5 Operating Reserve – Spinning Reserve Service

Spinning Reserve Service is needed to serve load immediately in the event of a system contingency. This service may be provided by generating units that are on-line and loaded at less than maximum output.

The Transmission Customer must either purchase this service from the Transmission Provider or make alternative comparable arrangements to satisfy its ***Spinning Reserve Service*** obligation.

Schedule 6 Operating Reserve – Supplemental Reserve Service

Supplemental Reserve Service is needed to serve load in the event of a system contingency, however, it is not available immediately to serve load but rather within a short period of time. This service may be provided by generating units that are on-line but unloaded, by quick-start generation or by interruptible load.

The Transmission Customer must either purchase this service from the Transmission Provider or make alternative comparable arrangements to satisfy its Supplemental Reserve Service obligation.

Other Ancillary Services

There are other Ancillary Services, such as System Restoration service, that may be identified within the SPG RTO. The RTO IMA, on behalf of the Transco, will provide these services in close coordination with the individual CAOs.

RTO IMA Responsibilities regarding Ancillary Services

Specifically RTO IMA's responsibilities with respect to Ancillary Services include:

- Serving as provider of last resort for AS Schedules 1, 2, 3, 4, 5, and 6 on behalf of the Transco.
- Providing for Ancillary Service Schedule 4 Energy Imbalance Service through the Real Time balancing market of the RTO .
- Following submission of Transmission Customers self-arranged schedules, identifying the remaining amount of Ancillary Services that must be acquired in order to complete the Day-Ahead Ancillary Services Plan.
- Procuring Ancillary Services as required from approved Ancillary Service providers and charging Transmission Customers for those Ancillary Services in accordance with the Market Rules.

- Ensuring that Transmission Customers have scheduled the required type and amount of Ancillary Services
- Monitoring parameters from all participants in order to ensure the delivery of ancillary services and apply penalties for non-conformance.
- Notifying the CAOs of approved Ancillary Service suppliers in their control area for use in the real-time dispatch process.

CAO Responsibilities regarding Ancillary Services

Specifically, CAO's responsibilities with respect to Ancillary Services include:

- If a customer does not self-supply Schedule 3 Regulation And Frequency Response Service, the CAO will provide this service until such time a regional market is established.
- Providing other ancillary services per market rules and RTO direction
- Calculating and managing the CAO Area Control Error (ACE).
- Providing input to the RTO system restoration plan.

1.4. Scheduling

Scheduling Overview

This protocol addresses the responsibilities for scheduling transactions within, between and across Control Areas in the SPG RTO and with Control Areas that border the SPG RTO.

RTO IMA Responsibilities regarding Scheduling

The RTO IMA is responsible for providing a single Scheduling system for the SPG RTO, and coordination with scheduling systems in place with neighboring RTOs.

Specifically, the RTO IMA's responsibilities with respect to Scheduling include:

- Provide electronic scheduling systems / processes for all inter and intra control area scheduling within the SPG RTO and first tier Control Areas outside the SPG RTO.
- Review and approval of schedules from a security coordination role.
- Validate transmission reservation information as part of the Transmission Service Provider approval.

- Require Load Serving Entities and Generators to approve portions of schedules or use host Control Area as agent based on the policy of each Control Area.
- Provide electronic checkout capability for schedules and net interchange between Control Areas.
- Provide net scheduled interchange targets for each control area taking into account approved schedules, energy balance needs and reserve sharing schedules.
- Approve all inter-control area schedules.
- Calculate all imbalance charges for the SPG RTO.
- Report control area inadvertent to NERC for all control areas in the SPG RTO.
- Account for losses to ensure customers self provide or purchase losses from the balancing market.
- Maintain historic records of schedules available for download by the CAO and other Control Areas.

The RTO IMA scheduling system, will:

- Interface with the RTO IMA tagging service to allow automatic schedule creation and consistent approval of tags and schedules.
- Provide schedules by Control Area in electronic format.
- Allow electronic upload of schedule approvals.
- Automatically validate transmission reservations, ramp, tags and losses, valid sources and sinks
- Apply CAO specific ramp limits at start and end of hour in validating schedules.
- Provide automatic checkout of matching control area to control area schedules.
- Maintain schedule transactions where first tier Control Areas do not use an Electronic Scheduling System.

CAO Responsibilities regarding Scheduling

Specifically, the CAO's responsibilities with respect to Scheduling include:

- Use of the RTO IMA Scheduling System for entry and approval of all inter and intra Control Area schedules.
- Perform Control Area validation of all tags and schedules.

- Maintain a CAO scheduling database to record approved tags and schedules and interface schedules with CAO’s EMS system.
- Interface RTO IMA scheduling system with CAO’s internal scheduling system (to automate upload and download of schedules) and interfaces from RTO IMA's Net Schedule Interchange (NSI) calculator to CAO's EMS for net interchange.
- The integrated schedule for dynamic schedules will be calculated by CAO and passed back to the RTO scheduling system.
- Maintain CAO's own scheduling and tag repository database for settlement and dispute management purposes. Some of this data may come from RTO IMA's webData repository
- Use the RTO IMA scheduling system for inter Control Area and schedule checkout in accordance with NERC policies where possible.
- Provide the RTO hourly Control Area calculated net interchange and inadvertent for monitoring purposes.

2.OASIS Operations

2.1. OASIS Operations Overview

Overall Responsibilities for OASIS Operations

Initially, the Transco will contractually delegate the OASIS operations outlined in the table below. The following table sets out the split of responsibilities for OASIS Operations activities between RTO IMA and the Transco:

RTO IMA Responsibilities	Transco Responsibilities
Provides OASIS node	Transco to ensure consistent business rules with RTO IMA
Approves OASIS requests	Performs System Impact Studies (SIS) when required. This task may be delegated to ITCs.
Calculates ATC	Provides inputs to the ATC calculation process
Implements network reconfiguration option	Review network reconfiguration options

2.2. OASIS Approvals and Postings

OASIS Approvals and Postings Overview

This protocol deals with the unified OASIS operations. A separate section deals with the calculation of available transfer capability (ATC) values.

This protocol recognizes that the RTO IMA OASIS system has to provide a uniform set of business rules and tariff details to provide one stop shopping in the SPG RTO. OASIS Automation system software also requires a uniform approach across the entire SPG RTO as it can only support one set of business rules and tariffs.

RTO IMA Responsibilities regarding OASIS Approval, Postings, and Related Business Processes

The RTO IMA's specific responsibilities with respect to OASIS Approval, Postings, and Related Business Processes include:

- Establishing and maintaining a single OASIS node serving the SPG RTO
- Calculating and publishing ATC and total transfer capability (TTC) values on an hourly, daily and monthly basis, depending on final market rules
- Approving all transmission requests, on behalf of the Transco, that do not require System Impact Studies.
- Maintaining the OASIS Automation function to reflect the common business rules for OASIS transactions adopted by the RTO IMA.
- Resynchronizing OASIS for changes in topology and energy schedules, or immediately in the event of a major system change.
- Coordinating with other RTOs to exchange reservation and ATC values
- Providing Transco access to the OASIS database
- Discussing and agreeing with Transco, at least an annual basis, the ATC / TTC calculation methods and the location of major transmission constraints.
- Posting transmission and ancillary services data to the OASIS site.

Transco Responsibilities regarding OASIS Approval, Postings, and Related Business Processes Text explaining overall responsibilities

Specifically, the Transco responsibilities with respect to OASIS Approval, Postings, and Related Business Processes include:

- Conducting short and long term impact studies in coordination with the RTO IMA. This function may be delegated to Independent Transmission Companies that meet FERCs independence requirements (ITCs) within the SPG RTO.
- At the Transco's option, calculate shadow ATC / TTC values using OASIS data for the SPG RTO and relevant neighboring RTO's (together with schedule and outage data) provided by the RTO IMA
- Agreeing at least annually with RTO IMA on the major transmission constraints to be modeled in the SPG RTO.

2.3. Calculation of ATC

Calculation ATC Overview

Regardless of the forward market design for transmission rights, the RTO IMA will still need to evaluate requests for transmission service for through transactions as well as point-to-point transactions that source or sink within the SPG RTO. To evaluate the availability of transmission capacity for these transactions, the RTO IMA will calculate the Available Transfer Capability of the transmission system.

Availability of transmission transfer capability does not inherently indicate the availability of instruments to hedge against the cost of congestion. The method of obtaining hedging instruments and the nature of these instruments are outlined in the congestion management market design section of the main document and the associated attachments.

At the simplest level the (ATC is a measure of a transmission system's capability to transfer energy above already committed levels without adversely affecting system reliability. It is a more complex concept than a simple measure of capacity.

The ATC is defined in the NERC report, *Available Transfer Capability Definitions and Determinations, June 1996,* in the following way:

> *"Transfer capability is the measure of the ability of interconnected electric systems to* reliably *move or transfer electric power from one area to another area by way of all transmission lines (or paths) between those areas under specified systems conditions. The units of transfer capability are in terms of electric power, generally expressed in megawatts (MW). In this context, area refers to the configuration of generating stations, switching stations, substations, and connecting transmission lines that may define an individual electric system, power pool, control area, sub-region, or region, or portion thereof."*

ATC is therefore an indicator of the transfer capability remaining in the physical network that can be delivered reliably across an interface and is obtainable for further commercial activity over and above already committed uses. Mathematically, TTC is ATC plus any existing transmission system commitments, including any applicable transfer capability margins and base case adjustments.

- ATC = TTC – TRM – CBM – Transmission Commitments

(Where CBM is the Capacity Benefit Margin and TRM is the Transmission Reliability Margin.)

The ATC is highly dependent on:

- Generation dispatch.
- Customer load demand.
- Transmission system conditions assumed for the target time period.
- The closeness of the target timeframe (the further out the timeframe, the less reliable the prediction).

The overall responsibility for calculating the ATC will reside with the RTO IMA, as delegated by the Transco.

RTO IMA Responsibilities regarding Calculation of ATC

Pursuant to the contractual arrangement between the Transco and the RTO IMA, the RTO IMA is responsible for the calculation of ATC for the SPG RTO.

Specifically, the RTO IMA's responsibilities with respect to calculation of ATC include:

- Calculation of ATC for the SPG RTO .
- Performing all ATC calculations utilizing a methodology that is mutually agreed to between the transmission owners and the RTO IMA.
- Ensuring that the calculations follow the principles outlined by NERC.
- Maintaining a documented methodology in the RTO IMA Criteria that outlines the basis of the ATC calculation and posting this methodology on OASIS.
- Ensuring that the ATC calculations are based on the NERC recommendations.
- Ensuring that the ATC calculations conform to the Federal Energy Regulation Commission's final rules relating to the promotion of wholesale electric competition through an open-access, non-discriminatory transmission service and the development of an open-access, real-time information system (Orders 888 and 889).
- Providing the Transco with RTO IMA OASIS data relating to transactions with other entities in real time.
- Incorporating sufficient detail in the EMS models to meet Transco requirements.
- Ensuring that ATC values are consistent with a simultaneously feasible set of transmission rights.
- Coordinating with adjoining reliability regions to ensure that differing calculation assumptions or methods between the adjoining regions and the SPG RTO do not invalidate the border ATC values.
- Coordinating with transmission owners on the calculation of Capacity Benefit Margins and Transmission Reservation Margins to be used and approving such values.

- Provide Transco with necessary data to allow for shadow calculation of ATC values, if requested.
- Ensuring that if data is required further out than 13 months, then a study can be requested.
- Developing short term load forecasts (days 1 to 7).
- Retaining data, models and information about the methodology used for calculations for a period of at least three years to comply with FERC regulations.
- Adjusting ATC as requests for transmission reservations are approved.
- Allowing Transco access to the OASIS database for Settlement purposes.

Transco Responsibilities regarding Calculation of ATC

Transco does not have a specific requirement to calculate ATC, but will provide inputs to the RTO IMA for calculation purposes. Specifically, Transco's responsibilities with respect to Calculation of ATC include:

- Establishing the ratings of its facilities for use by RTO IMA in conjunction with the various transmission owners for the RTO IMA's calculation of ATC.
- Advising ratings to RTO IMA.
- Reviewing limiting elements over time to identify constraints.
- Providing medium (8 to 31 days) and long term load forecasts (2 to 13 months) to RTO IMA for use in ATC projections.
- Calculating and recording CBM values approved by RTO IMA.
- Calculating and recording TRM values approved by RTO IMA.
- Retaining data, models and information about the methodology used for calculations in compliance with FERC regulations..
- Assembling information on all paths in its Control Area and making this information available to RTO IMA.